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NETWORK ANALYSIS: A SELECTED BIBLIOGRAPHY

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NETWORK ANALYSIS: A SELECTED BIBLIOGRAPHY

by

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Most of the work undertaken within the relatively new research area of Network Analysis relies very heavily upon a body of theory within topology known as graph theory. Many different types of problems are capable of being solved using this theory. Basic to all such problems is some type of graph consisting of a set of nodes connected by a set of arcs. Each of these arcs may be nominally scaled, representing connection or non-connection, or they may be weighted on the basis of some predetermined criteria so that importance of a connection may be ascertained. Such specification of a network or graph has facilitated use of the theory of graphs within at least five major areas of research. It is the intention of the bibliography to provide a working set of references within each of these areas. The list of references is by no means comprehensive in nature; that was not the intended design of the bibliography. With the recent increase in the numbers and types of studies dealing with networks, a need seems to have arisen for a compilation of some of the more visible work. This, then, is an attempt to present a series of studies which focus upon the topic of networks and the manner in which they have been considered in the literature.

As mentioned in the above statement the references will be divided into five sections. Because of the type of study some will be cross-referenced in one or more of the sections. Hopefully, this will

facilitate use of the bibliography. The five sections are titled:

I. Network Structure

II. Network Flows

III. Random Graphs

IV. Network Design

V. Network Routing

The first section deals primarily with specifying the physical structure of networks. Theoretical work describing various relationships between nodes and arcs are listed as well as more empirical work which has utilized and extended this initial body of theory. The second section presents material dealing with the general problem of optimizing flows through a given network. The basic problem can most succinctly be stated as follows. Given a network connecting a set of points, where each connection has a capacity constraint (or a set of constraints including cost and travel time), the problem is to select two cities and find the maximal amount of flow possible from one of the cities to the other using the entire given network. The third section is much more limited in scope than the other four; empirical work within this area is relatively unknown. Given a set of nodes and a set of arcs, this body of theory attempts to enumerate the total number of possible graphs of the system. The fourth section has recently arisen within a more applied context. Most of these studies use the theory of graphs in an attempt to derive "optimal" networks. Finally, in the last section are presented a series of studies which deal with the problem of seeking optimal routes through a network.

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